

WHAT IS CLAIMED IS:

1. A method of performing error diffusion, the method comprising the steps of:

simultaneously processing image data for at least two pixels in a row of pixels, said at least two pixels comprising a first group of pixels and a last pixel, said last pixel abutting a group of pixels to be processed next;

reducing the precision of said image data to produce a modified image data word and an error word for each pixel;

propagating a portion of said error word for each pixel in said first group to two pixels in a next row of pixels; and

propagating a first portion of said error word for said last pixel to a pixel in said next row of pixels and a second portion of said error word for said last pixel to a pixel in said group of pixels to be processed next.

2. The method of Claim 1 further comprising the steps of:

generating a pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said first group comprises:

dividing said error word into a first and a second portion;

subtracting said pseudo random number from said first portion to produce a first modified error word;

adding said pseudo random number to said second portion to produce a second modified error word; and

adding said first and said second modified error words to image data for a first and second pixel in said next row of pixels.

3. The method of Claim 2, where said first modified error word is added to image pixel data for a pixel directly below the pixel generating the error signal.

4. The method of Claim 2, where said second modified error word is added to image pixel data for a pixel directly below and to the right of the pixel generating the error signal.

5. The method of Claim 1 further comprising the steps of:

generating a pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

subtracting said pseudo random number from said first portion to produce a first modified error word;

adding said pseudo random number to said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

6. The method of Claim 1 further comprising the steps of:

generating a pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

adding said pseudo random number to said first portion to produce a first modified error word;

subtracting said pseudo random number from said second portion to produce a second modified error word;

5 adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

7. The method of Claim 1 further comprising the steps of:

10 generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said first group comprises:

dividing said error word into a first and a second portion;

15 adding said pseudo random number to said first portion to produce a first modified error word;

adding said pseudo random number to said second portion to produce a second modified error word; and

adding said first and said second modified error words to image data for a first and second pixel in said next row of pixels.

20 8. The method of Claim 1 further comprising the steps of:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

adding said first pseudo random number to said first portion to produce a first modified error word;

adding said second pseudo random number to said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

9. The method of Claim 1 further comprising the steps of:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said first group comprises:

dividing said error word into a first and a second portion;

adding said pseudo random number to said first portion to produce a first modified error word;

subtracting said pseudo random number from said second portion to produce a second modified error word; and

adding said first and said second modified error words to image data for a first and second pixel in said next row of pixels.

10. The method of Claim 1 further comprising the steps of:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

adding said first pseudo random number to said first portion to produce a first modified error word;

subtracting said second pseudo random number from said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

11. The method of Claim 1 further comprising the steps of:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

subtracting said first pseudo random number from said first portion to produce a first modified error word;

adding said second pseudo random number to said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

12. A display system comprising:

a controller for receiving and processing pixelated image data said controller:

5 simultaneously processing image data for at least two pixels in a row of pixels, said at least two pixels comprising a first group of pixels and a last pixel, said last pixel abutting a group of pixels to be processed next;

reducing the precision of said image data to produce a modified image data word and an error word for each pixel;

10 propagating a portion of said error word for each pixel in said first group to two pixels in a next row of pixels; and

propagating a first portion of said error word for said last pixel to a pixel in said next row of pixels and a second portion of said error word for said last pixel to a pixel in said group of pixels to be processed next.

15 a light source for generating a beam of light along a first light path;

a light modulator for selectively modulating light along said first light path in response to image data signals from said controller.

13. The display system of Claim 12, said controller:

generating a pseudo random number; and

20 wherein said propagating a portion of said error word for each pixel in said first group comprises:

dividing said error word into a first and a second portion;

subtracting said pseudo random number from said first portion to produce a first modified error word;

adding said pseudo random number to said second portion to produce a second modified error word; and

5 adding said first and said second modified error words to image data for a first and second pixel in said next row of pixels.

14. The display system of Claim 12, said controller:

generating a pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

subtracting said pseudo random number from said first portion to produce a first modified error word;

adding said pseudo random number to said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

20 15. The display system of Claim 12, said controller:

generating a pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

adding said pseudo random number to said first portion to produce a first
modified error word;

subtracting said pseudo random number from said second portion to produce a
second modified error word;

adding said first modified error word to image data for a pixel in said next row
of pixels; and

adding said second modified error word to image data for a pixel in said group
of pixels to be processed next.

16. The display system of Claim 12, said controller:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said first group
comprises:

dividing said error word into a first and a second portion;

adding said pseudo random number to said first portion to produce a first
modified error word;

adding said pseudo random number to said second portion to produce a
second modified error word; and

adding said first and said second modified error words to image data for a first
and second pixel in said next row of pixels.

17. The display system of Claim 12, said controller:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

adding said first pseudo random number to said first portion to produce a first modified error word;

adding said second pseudo random number to said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

18. The display system of Claim 12, said controller:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said first group comprises:

dividing said error word into a first and a second portion;

adding said pseudo random number to said first portion to produce a first modified error word;

subtracting said pseudo random number from said second portion to produce a second modified error word; and

adding said first and said second modified error words to image data for a first and second pixel in said next row of pixels.

19. The display system of Claim 12, said controller:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

adding said first pseudo random number to said first portion to produce a first modified error word;

subtracting said second pseudo random number from said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group of pixels to be processed next.

20. The display system of Claim 12, said controller:

generating a first and second pseudo random number; and

wherein said propagating a portion of said error word for each pixel in said second group comprises:

dividing said error word into a first and a second portion;

subtracting said first pseudo random number from said first portion to produce a first modified error word;

adding said second pseudo random number to said second portion to produce a second modified error word;

adding said first modified error word to image data for a pixel in said next row of pixels; and

adding said second modified error word to image data for a pixel in said group
of pixels to be processed next.